Course descriptions

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COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ+KMANM/2-MMN-111/15	**Course title:** Algorithms on Networks

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Intermittent assessment: homework (30%), project (15%), project presentation (5%)
Exam: written (50%)
To successfully complete the course, student has to obtain at least 50% of points on the final exam
Final grade: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 60/40

Learning outcomes:
Complex systems can often be represented as a network of a number of interacting components. The aim of the course is to get explore examples of complex networks in applications in physics, informatics, biology and social sciences, as well as with algorithmic, but also computational and statistical methods for the analysis of their behavior.

Class syllabus:
Introduction to networks. Computational complexity. Measures and metrics on networks. Labyrinth exploration. Search for strong digraph components. Optimal paths. Time analysis of projects. The cheapest connection networks. Optimal flows. Project cost analysis. Random network models and their characteristics. Network dynamics.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 192

A	B	C	D	E	FX
19,79	28,13	17,19	18,75	15,1	1,04

Lecturers: prof. RNDr. Ján Plesník, DrSc., Mgr. Katarína Boďová, PhD., Mgr. Andrej Badík

Last change: 24.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-116/19	**Course title:** Cluster analysis and data classification
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 2 **per level/semester:** 26 / 26 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Evaluation based on: project (teaching period), oral exam Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 50/50	
Learning outcomes: The students understand the principles and practical realization of selected methods of cluster analysis and statistical data classification.	
Class syllabus: Selected multivariate data visualization methods, partitional clustering (k-means, k-medoids, DBSCAN, OPTICS, clustering based on the mixture of Gaussian distributions, spectral clustering), hierarchical clustering, general introduction to the statistical classification methods, Bayes classifier, k nearest neighbors, linear and quadratic discrimination, classification trees and forests, bagging and boosting, support vector machines, multinomial regression as a classification method	
Recommended literature: Izenman A: Modern Multivariate Statistical Techniques: Regression, Classification, and Manifold Learning (Springer Texts in Statistics) 1st ed., 2nd printing 2013; James G, Witten D, Hastie T, Tibshirani R: An Introduction to Statistical Learning: with Applications in R (Springer Texts in Statistics) 2nd ed., Springer 2021; Harman R: Multivariate Statistical Analysis (Selected Lecture Notes), study materials of the lecturer, 2021.	
Languages necessary to complete the course: Slovak, English	
Notes: The knowledge of the software R is recommended. Enrollment limit: 40 students	

Past grade distribution
Total number of evaluated students: 59

A	B	C	D	E	FX
61,02	20,34	8,47	0,0	1,69	8,47

Lecturers: doc. Mgr. Radoslav Harman, PhD.

Last change: 10.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-109/15	**Course title:** Computer Statistics
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: project (teaching period), oral exam Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 70/30	
Learning outcomes: Students will be able to perform some rather advanced statistical analyses, using the software R.	
Class syllabus: 1. Contingency tables, graphical representation, test of independence, homogeneity test, odds ratio, McNemar's test, Simpson's paradox and the Cochran-Mantel-Haenszel test, Bowker's test, Fisher's exact test. 2. Logistic regression: interpretation of parameters, probability vs. odds, deviance, tests of submodels, Wald tests and confidence intervals, graphical representation, pseudo coefficients of determination, logistic regression as a classifier. 3. Permutation versions of the t-test and ANOVA. 4. Bootstrap: estimation of variation, confidence intervals, application to regression, a demonstration of misuse.	
Recommended literature: Agresti A: Categorical Data Analysis 3rd ed. W Agresti A: Categorical Data Analysis 3rd ed. Wiley 2012; Anděl J: Statistické metody. Matfyzpress 2007.	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution
Total number of evaluated students: 256

A	B	C	D	E	FX
71,88	18,36	6,25	1,17	1,95	0,39

Lecturers: Mgr. Ján Somorčík, PhD.

Last change: 11.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-117/12	**Course title:** Convex Optimisation
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Recommended prerequisites: Nonlinear programming, Linear programming	
Course requirements: Homeworks, Project presentation Grading A 91%, B 81%, C 71%, D 61%, E 51% Scale of assessment (preliminary/final): 60% /40%	
Learning outcomes: Student learn the basic theory of convex analysis and convex (conic) optimization, basic classes of convex conic programming, and methods for solving them, they learn the duality theory of conic linear programming. They are able to use Matlab and CVX (cvxopt) modeling system for solving convex problems, they are able to solve various practical problems and applications.	
Class syllabus: Convex optimization problems in standard form Generalization of standard convex problems Conic convex problems (SDP, SOCP,..) Geometry of convex cones Duality theory for conic linear programs Applications of convex conic problems Conic relaxations Interior point methods	
Recommended literature: M. Trnovská: Konvexná optimalizácia, elektronický text. Boyd, Vandenberghe: Convex Optimization, Cambridge Univ.Press 2004 CVX: Matlab Software for Disciplined Convex Programming www.stanford.edu/~boyd/cvxbook Ben-Tal, Nemirovski: Lectures on Modern Convex Optimization, SIAM 2001	
Languages necessary to complete the course:	

Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 99

A	B	C	D	E	FX
69,7	13,13	8,08	3,03	4,04	2,02

Lecturers: doc. RNDr. Mária Trnovská, PhD.

Last change: 16.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-219/19	**Course title:** DEA Seminar
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 4

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Margaréta Halická, CSc.

Last change: 03.09.2019

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-142/19	**Course title:** Data Dimensionality Reduction
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 55	

A	B	C	D	E	FX
58,18	23,64	10,91	1,82	0,0	5,45

Lecturers: doc. Mgr. Radoslav Harman, PhD., Mgr. Samuel Rosa, PhD.	
Last change: 02.05.2019	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-113/18	**Course title:** Databases and Data Analysis
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KAMŠ/2-EFM-113/17	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 145

A	B	C	D	E	FX
89,66	3,45	4,83	0,69	0,69	0,69

Lecturers: Mgr. Stanislav Sekereš	
Last change: 12.12.2018	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/1-PMA-741/00	**Course title:** Demography Statistics
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 1 **per level/semester:** 26 / 13 **Form of the course:** on-site learning	
Number of credits: 4	
Recommended semester: 1.	
Educational level: I., II.	
Prerequisites:	
Course requirements: The course assessment consists of three parts. The semester evaluation has a weight of 33% and consists of solving individual assignments during the semester. In the exam period, it is possible to obtain another 33% for the elaboration and submission of the project. In order to meet the minimal condition to sit the final exam, the student must obtain at least half of the possible points from the semester evaluation and the project, respectively. The last part of the assessment has a weight of 34% and consists of a discussion about the project and an oral exam. To successfully complete the course, it is necessary to obtain at least half of the possible points in the third part of the assessment. Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%. Scale of assessment (preliminary/final): Practical work during semester 33% / final exam 67%.	
Learning outcomes: After completing the course students will control the basics of demographics for the purpose of actuarial practice. They will be able to construct life tables and assess the statistical properties of demographic indicators and apply statistical methods in demographic analyzes.	
Class syllabus: Basics of demography. Demographic data, sources of demographic data. Demographic indicators. Standardization and decomposition. Probability models for the number of demographic events. Construction of life tables from statistical data. Force of mortality, mathematical modeling of the force of mortality. Multiple decrement tables. Actuarial demography.	
Recommended literature: Slovník demografických pojmov / Danuša Jurčová. Bratislava : INFOSTAT – Inštitút informatiky a štatistiky, Výskumné demografické centrum, Edícia: Akty, 2005, ISBN 80-85659-40-9 [available on the Internet]; Methods of Demographic Analysis / Farhat Yusuf, Jo. M. Martins, David A. Swanson. First Edition, Dordrecht : Springer Netherlands, 2014, ISBN 978-94-007-6784-3;	

Fundamentals of Demographic Analysis: Concepts, Measures and Methods / Gordon A. Carmichael. First Edition, Cham : Springer International Publishing, Switzerland, 2016, ISBN 978-3-319-23255-3;
study materials of the lecturer.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 214

A	B	C	D	E	FX
31,31	15,42	19,63	13,08	17,29	3,27

Lecturers: Mgr. Gábor Szűcs, PhD., Mgr. Matúš Padyšák

Last change: 16.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-237/15	**Course title:** Digital Signal Processing
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 73

A	B	C	D	E	FX
69,86	17,81	5,48	1,37	0,0	5,48

Lecturers: Mgr. Miriam Kristeková, PhD.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-920/00	**Course title:** Diploma Thesis Seminar
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Presentation (50%), project elaboration (50%). Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will get acquainted with the formal requirements of writing professional literature and with the methods of presenting results on professional forums.	
Class syllabus: Students present a 15 minute talk on their thesis in the corresponding state of completion and respond to questions and comments of their classmates. In addition to the presentation, the student has to submit several pages of his/her thesis electronically or in a printed form at its end.	
Recommended literature: By choice of the thesis supervisor	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 515	

A	B	C	D	E	FX
77,09	15,92	4,66	0,97	0,19	1,17

Lecturers: prof. RNDr. Daniel Ševčovič, DrSc., doc. Mgr. Igor Melicherčík, PhD.	
Last change: 20.06.2022	
Approved by:	

STATE EXAM DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-991/15	**Course title:** Diploma Thesis and its Defense
Number of credits: 25	
Educational level: II.	
State exam syllabus:	
Last change:	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-119/21	**Course title:** Dynamic Macroeconomics

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: II.

Prerequisites:

Antirequisites: FMFI.KAMŠ/2-EFM-119/15

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 5

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Ján Boďa, CSc.

Last change:

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-115/15	**Course title:** Economics Seminar
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 28

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Ján Boďa, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-125/00	**Course title:** Economics of Information

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Continuous assessment four equivalent home-works.
Approximate rating scale: A 100-90%, B 89-80%, C 79-70%, D 69-60%, E 59-50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
The student will be able to decide in an asymmetric information environment. It will be able to analyze the relevant models and compose contracts in asymmetric information.

Class syllabus:
Classes of models with asymmetric information. Subjective risk with hidden action or hidden information. Adverse selection. Mechanism design and post-contractual hidden knowledge. Signalling and detection.

Recommended literature:
E. Rasmusen: Games and Information, An Introduction to Game Theory, 4th Edition. Blackwell Publishers, 2006
Mas-Collel, Whinston, Green: Microeconomic Analysis. Oxford University Press, 1995
Fudenberg , Tirole: Game Theory. MIT Press,1998

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 238

A	B	C	D	E	FX
99,16	0,0	0,0	0,0	0,0	0,84

Lecturers: doc. RNDr. Ján Pekár, PhD.

Last change: 15.06.2022

Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-228/00	**Course title:** Econophysics
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 40/60	
Learning outcomes:	
Class syllabus: Utilization opportunities of the principles and methods of statistical physics in economy and finance. Fractal and power-law probability distributions. Scaling and universality in physics. Power-law probability distributions in economy and finance. Minority games. Statistical mechanics of money.	
Recommended literature: An introduction to Econophysics : Correlations and Complexity in Finance / Rosario N. Mantegna, H. Eugene Stanley. Cambridge : Cambridge University Press, 2000	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 170	

A	B	C	D	E	FX
75,88	10,0	14,12	0,0	0,0	0,0

Lecturers: doc. RNDr. Ján Boďa, CSc.	
Last change: 18.06.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAI/2-MXX-130/21	**Course title:** Elements of AI

Educational activities:
Type of activities: independent work
Number of hours:
per week: 25 **per level/semester:** 325
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Passing the online course https://course.elementsofai.com/ (in Enlish or Slovak version).

Learning outcomes:
The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.

Class syllabus:
1. What is artificial intelligence: related areas, AI philosophy.
2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games
3. Probability and chance, Bayes' theorem, naive Bayesian classification.
4. Machine learning: nearest neighbor classifier, regression.
5. Neural networks: basics, creation, modern techniques.
6. Consequences: on predicting the future, the effects of AI on society, summary.

Recommended literature:
Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library.
Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.

Languages necessary to complete the course:
Slovak or English

Notes:
The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.

Past grade distribution
Total number of evaluated students: 37

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Mária Markošová, PhD.

Last change: 22.08.2021	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAI/2-MXX-130/21	**Course title:** Elements of AI
Educational activities: **Type of activities:** independent work **Number of hours:** **per week:** 25 **per level/semester:** 325 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Passing the online course https://course.elementsofai.com/ (in Enlish or Slovak version).	
Learning outcomes: The student will get acquainted with selected basic concepts of artificial intelligence and their use in solving various practical tasks.	
Class syllabus: 1. What is artificial intelligence: related areas, AI philosophy. 2. Troubleshooting and UI: Browsing and troubleshooting, browsing and games 3. Probability and chance, Bayes' theorem, naive Bayesian classification. 4. Machine learning: nearest neighbor classifier, regression. 5. Neural networks: basics, creation, modern techniques. 6. Consequences: on predicting the future, the effects of AI on society, summary.	
Recommended literature: Russell S., Norwig P. (2010). Artificial Intelligence: A Modern Approach, (3rd ed.), Prentice Hall. Available in faculty library. Marsland S. (2015). Machine Learning: An Algorithmic Perspective, (2nd ed.), CRC Press.	
Languages necessary to complete the course: Slovak or English	
Notes: The course consists of 20 numerical and 5 text-based tasks. Numerical tasks are checked automatically, text-based tasks are evaluated anonymously by students.	
Past grade distribution Total number of evaluated students: 37	

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Mária Markošová, PhD.

Last change: 22.08.2021	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-233/13	**Course title:** English Conversation Course (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3.

Educational level: I., II.

Prerequisites:

Course requirements:
tests, presentations, essays
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational English as well as English for specific purposes appropriate for university students. This course is a follow up of the previously taught ESP course.

Class syllabus:
This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge.

Recommended literature:
Appropriate study material is supplied based on the participants'level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 215

A	B	C	D	E	FX
67,44	13,02	6,51	1,86	1,4	9,77

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-234/13	English Conversation Course (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4.

Educational level: I., II.

Prerequisites:

Course requirements:
tests, oral presentations, essays
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Continual improvement of all language skills focused on communication/speaking, listening comprehension and writing. The emphasis is on discourse, lexicology and morphology, word-bank broadening of communicational/spoken English as well as English for specific purpose appropriate for university students. This course is a follow up of the Conversational English course 1.

Class syllabus:
This course's focus is to broaden spoken/communicational English for students with B2/C1 level of English knowledge(Upper-Intermediate/Lower Advanced).

Recommended literature:
Appropriate study material is supplied based on the participants' level of English by the lecturer. (Sources- The Guardian, The Herald Morning Sun. The Nine News, The West Australian, BBC News and podcasts, CNN podcasts).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 146

A	B	C	D	E	FX
77,4	12,33	3,42	1,37	0,0	5,48

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-153/17	**Course title:** Finance and Insurance in Practice (1)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1., 3.

Educational level: II.

Prerequisites:

Course requirements:
During the semester the student can obtain 100% of points, for active participation in seminars (80%), solving tasks during seminars (20%), and possibly for additional individual practical work.
Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%.
Scale of assessment (preliminary/final): Practical work during semester 100% / final exam 0%.

Learning outcomes:
After completing the course, the student will master the basics of work in the financial and insurance business. Student should also learn about the roles of the actuary, risk manager and financial analyst.

Class syllabus:
Basic financial and insurance segments. Banks and insurance companies - joint-stock companies and their legislative background.
The role of financial analysts, risk managers and actuaries in banks, insurance companies and in other financial institutions. International professional qualification of actuaries, stages in actuarial qualification, the career of an actuary. Profession of Actuary in Slovakia and globally.
Professional software used in financial and insurance practice.

Recommended literature:
Poisťovníctvo / Anna Majtánová a kolektív. Bratislava : Wolters Kluwer (Iura Edition), 2009;
Lecturer's notes and handouts.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 70

A	B	C	D	E	FX
78,57	15,71	1,43	1,43	1,43	1,43

Lecturers: Mgr. Gábor Szűcs, PhD.
Last change: 16.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-154/17	**Course title:** Finance and Insurance in Practice (2)

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2., 4.

Educational level: II.

Prerequisites:

Course requirements:
During the semester the student can obtain 100% of points, for active participation in seminars (80%), solving tasks during seminars (20%), and possibly for additional individual practical work.
Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%.
Scale of assessment (preliminary/final): Practical work during semester 100% / final exam 0%.

Learning outcomes:
After completing the course, the student will master the basics of work in the financial and insurance business. Student should also learn about the roles of the actuary, risk manager and financial analyst.

Class syllabus:
Basic financial and insurance segments. Actuarial model development in life and non-life insurance. Financial modelling.
The role of financial analysts, risk managers and actuaries in banks, insurance companies and in other financial institutions. Professional requirements for financial analysts, risk managers and actuaries.
Professional software used in financial and insurance practice.

Recommended literature:
Poisťovníctvo / Anna Majtánová a kolektív. Bratislava : Wolters Kluwer (Iura Edition), 2009;
Lecturer's notes and handouts.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 54

A	B	C	D	E	FX
75,93	11,11	9,26	1,85	0,0	1,85

Lecturers: Mgr. Gábor Szűcs, PhD.
Last change: 16.06.2022
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-106/15	**Course title:** Financial Derivatives

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 2.

Educational level: II.

Prerequisites: FMFI.KAMŠ/2-EFM-107/15 - Partial Differential Equations

Recommended prerequisites:
Knowledge of stochastic processes and partial differential equations.

Course requirements:
Assessment during the term: Homework (25%), test (15%).
Exam: Written exam (40%), oral exam (20%).
Grading: A: 90 and more, B: [80, 90), C: [70, 80), D: [60, 70), E: [50, 60), FX: less than 50
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Students learn basics of modelling financial derivatives based on stochastic processes and partial differential equations. They gain key competences in the field of financial mathematics, analytical and numerical methods of pricing financial derivatives.

Class syllabus:
Financial derivatives. Call and put option on a stock. Put-call parity. Bounds of option proces. Combined option strategies.
Stochastic processes. Wiener process, Brownian motion, geometric Brownian motion. Probability distribution, expected value and variance of a GBM. GBM as a model for a stock price, estimation of its parameters from stock prices. One-dimensional and multi-dimensional Ito lemma.
Black-Scholes and Merton model. Derivation of the partial differential equation of the derivative price - two approaches (Black-Scholes and Merton). Terminal conditions.
Pricing of call and put options - solving the Black-Scholes PDE. Pricing put options using put-call parity. Pricing option strategies. Comparison of theoretical pricing results wit real market data.
Volatility. Historical volatility of stocks. Implied volatility. Volatility smile.
Greeks - sensitivity to parameters. Delta of an option, using delta to secuting portfolio - delta hedging. Gamma of an option. Other factors: theta (sensitivity to time), vega (sensitivity to a change of volatility), rho (sensitivity to interest rate).
Modelling transaction costs - Leland model. Nonlinear PDE for derivatives prices, its explicit solution in the case of call and put options. Modelling bid-ask spreads. Computation of implied

parameters (volatility, time between two adjustments of a portfolio) from data. Infomatively other nonlinear models.
Numerical methods of pricing European derivatives. Explicit scheme for solving Black-Scholes equation. Binomial and trinomial tree. Implicit scheme and solving the corresponding system of linear equations, SOR method.
Americal type of derivatives and their pricing. Pricing American options via free boundary problems Pricing American options via linear complementarity problems.
Numerical methods for pricing American derivatives. Projected SOR method. Identification of early exercise boundary for an American option. Infomatively - research in the area of early exercise boundary analysis.
Modelling instantaneous interest rate. One-factor models, Vasicek, CIR and CKLS models. Density of a stochastic process, Fokker-Planck equation. Calibration of the Vasicek model by the maximum likelihood method and Nowman estimates of the CKLS model - basic ideas. Infomatively various types of two-factor models.
Pricing interest rate derivatives. PDE for the price of an interest rate derivative. Bonds and time structure of interest rates. Pricing bonds in concrete models.
Modelling exotic financial derivatives. Asian options, barrier options. Basket options and options on indices. Overview of other types of exotic options.

Recommended literature:
Analytické a numerické metódy oceňovania finančných derivátov / Daniel Ševčovič, Beáta Stehlíková, Karol Mikula. Bratislava : Slovenská technická univerzita, 2009
Analytical and numerical methods for pricing financial derivatives / Daniel Sevcovic, Beáta Stehlíková, Karol Mikula. New York : Nova Science, 2011
Mathematical Models of Financial Derivatives / Yue Kuen Kwok. Singapore : Springer, 1998

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 174

A	B	C	D	E	FX
33,33	21,84	21,26	10,92	10,34	2,3

Lecturers: doc. RNDr. Beáta Stehlíková, PhD.

Last change: 17.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID:	**Course title:**
FMFI.KJP/1-MXX-141/00	French Language (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
French language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of French.

Recommended literature:
Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 435

A	B	C	D	E	FX
45,75	20,0	18,85	8,74	2,3	4,37

Lecturers: Mgr. Ľubomíra Kožehubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-142/00	**Course title:** French Language (2)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: The subject continues the program of French language (1) and provides courses of essential and intermediate French language.	
Recommended literature: Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 265	

A	B	C	D	E	FX
38,87	25,28	19,62	10,19	2,64	3,4

Lecturers: Mgr. Ľubomíra Kožehubová	
Last change: 20.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-241/00	**Course title:** French Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
The subject provides a course of intermediate French language, covering not only general, but also technical language.

Recommended literature:
Capelle Guy, Menand Robert: Le Nouveau taxi 1, Hachette FLE Paris, France 2009, ISBN 978-2-01-155548 - 9

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 104

A	B	C	D	E	FX
39,42	27,88	21,15	6,73	0,96	3,85

Lecturers: Mgr. Ľubomíra Koželubová

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-242/00	**Course title:** French Language (4)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: The subject provides a course of intermediate French covering not only general, but also technical French language.	
Recommended literature: Menand Robert: Le Nouveau taxi 2, Hachette FLE, Paris, France 2009, ISBN 978-2-01-155551 - 9	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 74	

A	B	C	D	E	FX
41,89	32,43	17,57	2,7	1,35	4,05

Lecturers: Mgr. Ľubomíra Kožehubová	
Last change: 20.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-151/00	**Course title:** German Language (1)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)	
Class syllabus: German language is taught at three levels: beginner, intermediate and advanced. Students opt for one of them depending on whether they need to learn the fundamentals or maintain and/or improve their previous knowledge. This course's focus is to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)	
Recommended literature: Appropriate study material is supplied by teacher based on the participants'level of German proficiency.	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 734	

A	B	C	D	E	FX
36,1	27,25	19,62	8,99	2,72	5,31

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.	
Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-152/00	**Course title:** German Language (2)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: To master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)	
Class syllabus: German language is taught at two levels: beginner and intermediate. Students opt for one of them depending on whether they wish to obtain the fundamentals of the language or wish to maintain and/or improve previous knowledge of German. This course's focus is to to master the fundamentals of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency)	
Recommended literature: Appropriate study material is supplied by teacher based on the participants'level of German proficiency	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 480	

A	B	C	D	E	FX
36,04	20,21	20,83	13,13	3,33	6,46

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.	
Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-251/00	**Course title:** German Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)

Class syllabus:
The course is a follow-up to the German language (1,2). The subject provides a course of intermediate or advanced German language.
This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency).

Recommended literature:
Appropriate study material is supplied by teacher based on the participants' level of German proficiency.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 165

A	B	C	D	E	FX
41,21	25,45	20,61	6,67	2,42	3,64

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-252/00	**Course title:** German Language (4)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Master the basics of general language and basic professional terminology of individual fields of study (depending on the advanced level of students)	
Class syllabus: The course is a follow-up to the German language (1-3). It provides a course of intermediate and advanced German language. This course's focus is to deepen the knowledge of the common language and basic technical terms of particular fields of study (depending on the student's level of German proficiency).	
Recommended literature: Appropriate study material is supplied by teacher based on the participants'level of German proficiency.	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 90	

A	B	C	D	E	FX
42,22	24,44	12,22	12,22	3,33	5,56

Lecturers: Mgr. Alexandra Maďarová, Mgr. Simona Tomášková, PhD.	
Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-126/00	**Course title:** Industrial Organization
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment four equivalent home-works. Approximate rating scale: A 100-90%, B 89-80%, C 79-70%, D 69-60%, E 59-50% Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Students will be able to recognize the individual types of markets to build their models and look for equilibrium outputs.	
Class syllabus: Marker structure and competition: perfect competition; monopoly; oligopoly; costs. Obstacles in entering the market, fusions. Vertical obstacles and vertical connecting. Firms' entering to market, leaving market, obstacles by entering. Strategies of price determination and product differentiation. Fusions, cartels, agreements. Research and development: investments to research and development, licences. Advertisement. Marketing strategies. Quality and endurance of products.	
Recommended literature: Industrial organization : Theory and applications / Oz Shy. Massachusetts : The MIT Press, 1995 The Theory of Industrial Organization. Cambridge, Mass. : MIT Press, 1997.	
Languages necessary to complete the course: Slovak, English	
Notes:	
Past grade distribution Total number of evaluated students: 211	

A	B	C	D	E	FX
97,16	2,37	0,0	0,0	0,0	0,47

Lecturers: doc. RNDr. Ján Pekár, PhD.

Last change: 15.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-201/15	**Course title:** Insurance Theory
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 4 **per level/semester:** 52 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 3.	
Educational level: II.	
Prerequisites: FMFI.KAMŠ/2-EFM-104/17 - Stochastic Calculus and Its Applications	
Course requirements: Examination: Written and oral examination. Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%. Scale of assessment (preliminary/final): 0/100	
Learning outcomes: After completing the course, the student will master mathematical modeling techniques in life and non-life insurance. He or she will be able to solve typical problems, e.g. premium calculation, reserving and actuarial estimation. Student will also get acquainted with forms of deductible and reinsurance, credibility theory and methods of actuarial modeling.	
Class syllabus: Methods of mathematical modeling in life and non-life insurance, actuarial model construction techniques. Deductible, excess and franchise. Reinsurance: proportional and non-proportional forms of reinsurance. American credibility theory and Bayesian credibility theory. Estimation of reserves in non-life insurance, deterministic and stochastic run-off triangles. Unit Linked Insurance Plans (ULIP). Profit testing in insurance business: present value of future profits, profit margin, internal rate of return. Yield curves and their applications in insurance. Accounting standard IFRS 17 and its impact on the actuarial calculations.	
Recommended literature: Life Insurance Mathematics / Hans U. Gerber. Heidelberg : Springer, 1997, ISBN 978-3-662-03460-6; Modely v životnom a neživotnom poistení / Rastislav Potocký. Bratislava : Statis, 2012; Modern Actuarial Risk Theory Using R / Rob Kaas, Marc Goovaerts, Jan Dhaene, Michel Denuit. Second Edition, Heidelberg : Springer-Verlag, 2008; Poistná matematika / Viera Sekerová, Mária Bilíková, Bratislava : Ekonóm, 2005; Aplikovaná poistná štatistika / Viera Pacáková. Bratislava : Iura Edition, 2004.	
Languages necessary to complete the course: Slovak, English	

Notes:

Past grade distribution
Total number of evaluated students: 70

A	B	C	D	E	FX
47,14	20,0	20,0	4,29	8,57	0,0

Lecturers: Mgr. Gábor Szűcs, PhD.

Last change: 24.11.2021

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-217/11	**Course title:** Insurance Theory Classes

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: II.

Prerequisites:

Recommended prerequisites:
2-EFM-201 Insurance Mathematics

Course requirements:
During the semester the student can get 100% points for one written test, which is usually written during the last two weeks of the semester.
Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%.
Scale of assessment (preliminary/final): Practical work during semester 100% / final exam 0%.

Learning outcomes:
After completing the course, the student will master mathematical modeling techniques in life and non-life insurance. He or she will be able to solve typical problems, e.g. premium calculation, reserving and actuarial estimation. Student will also get acquainted with forms of deductible and reinsurance, credibility theory and actuarial modeling methods.

Class syllabus:
Methods of mathematical modeling in life and non-life insurance, actuarial model construction techniques. Deductible, excess and franchise. Reinsurance: proportional and non-proportional forms of reinsurance. Bonus-malus schemes and No-Claim Discount (NCD) systems. American credibility theory and Bayesian credibility theory. Estimation of technical provisions in non-life insurance, deterministic run-off triangles: chain-ladder method, separation method and other methods. Unit Linked Insurance Plans (ULIP). Profit testing in insurance business: present value of future profits, profit margin, internal rate of return. Yield curves and their applications in insurance.

Recommended literature:
Life Insurance Mathematics / Hans U. Gerber. Heidelberg : Springer, 1997, ISBN 978-3-662-03460-6;
Modely v životnom a neživotnom poistení / Rastislav Potocký. Bratislava : Statis, 2012;
Modern Actuarial Risk Theory Using R / Rob Kaas, Marc Goovaerts, Jan Dhaene, Michel Denuit. Second Edition, Heidelberg : Springer-Verlag, 2008;
Aplikovaná poistná štatistika / Viera Pacáková. Bratislava : Iura Edition, 2004;

study materials of the lecturer.

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 139

A	B	C	D	E	FX
47,48	21,58	10,07	7,19	6,47	7,19

Lecturers: Mgr. Gábor Szűcs, PhD., Mgr. Lívia Rosová, PhD.

Last change: 16.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-MAT-114/15	**Course title:** Integral Transforms and Special Functions

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: II.

Prerequisites:

Course requirements:
midterm test,
final exam
Scale of assessment (preliminary/final): 33/67

Learning outcomes:
Students will learn methods of integral transforms and basic properties of some special functions from the point of view of applications in solving differential equations.

Class syllabus:
Fourier transform, Laplace transform, Bessel functions, Legendre polynomials and their applications.

Recommended literature:
Mathematical physics: Basic equations and special functions / Vasilij Jakovlevič Arsenin ; in Slovak, translated by Jozef Kačur. Bratislava : Alfa, 1977,
Fourier series and integral transforms / Allan Pinkus, Samy Zafrany. Cambridge : Cambridge University Press, 1997

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 33

A	B	C	D	E	FX
42,42	27,27	6,06	3,03	6,06	15,15

Lecturers: prof. RNDr. Marek Fila, DrSc.

Last change: 12.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-139/10	**Course title:** Interior-point methods in linear programming
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: The fundamentals and history of interior-point methods in mathematic programming. Basic theories of interior-point methods in linear programming. Central path and its properties. Overview of interior-point algorithms. Estimation of the polynomial complexity of the primal-dual algorithms of following the central path. Implementation of algorithms.	
Recommended literature: R. J. Vanderbei: Linear Programming: Foundations and Exensions, Kluwer, Boston 1977, available on http://www.princeton.edu/irvdb/LPbook M. Kabát: Metódy vnútorného bodu v lineárnom programovaní a ich aplikácie vo financiách, Diploma thesis (supervisor: M.Halická), FMFI UK, Bratislava, 2013	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 6	

A	B	C	D	E	FX
83,33	16,67	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Margaréta Halická, CSc.	
Last change: 17.06.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-218/16	**Course title:** Macroeconomic Development and Economic Policies in Slovakia

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 107

A	B	C	D	E	FX
50,47	31,78	15,89	0,0	1,87	0,0

Lecturers: Mgr. Ján Tóth

Last change:

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-PMS-118/10	**Course title:** Markov Processes (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Preliminary semester evaluation: test and homeworks
Examination: written examination
Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%

Learning outcomes:
After completing the course the student will master elementary discrete time Markov chains models. He will be able to classify states of a Markov chain and calculate stationary probability distributions.

Class syllabus:
Markov property, transition probabilities, transition matrix, Chapman Kolmogorov equation, irreducibility of a chain. Classification of states, recurrent states, transient states, null recurrent states and positive recurrent states, periodicity. Existence of stationary distribution, ergodic distribution, necessary and sufficient conditions for ergodicity. Random walks, branching processes, absorbtion probabilities, mean time to absorbtion. Markov reward chains algorithms and Markov Chain Monte Carlo.

Recommended literature:
Kalas, J: Markovove reťazce, skriptá MFF UK
Norris, J.R.: Markov chains (1998)
Ross, S.M.: Introduction to probability models (2006)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 245

A	B	C	D	E	FX
22,45	22,04	26,53	20,41	7,35	1,22

Lecturers: doc. RNDr. Katarína Janková, CSc., doc. Mgr. Pavol Bokes, PhD., Candan Çelik, PhD.

Last change: 02.05.2017	
Approved by:	

STATE EXAM DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-952/15	**Course title:** Mathematical and Financial Modelling
Number of credits: 4	
Educational level: II.	
State exam syllabus:	
Last change: 06.03.2020	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.VC/2-EFM-220/20	**Course title:** Mathematics and Music
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 5	

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. RNDr. Peter Mederly, CSc.	
Last change: 26.06.2020	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-236/15	**Course title:** Modelling Biological Processes
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Continuous assessment: homework, exam during the semester Exam: written and oral Approximate grading scale: A 90%, B 80%, C 70%, D 60%, E 50%	
Learning outcomes: Passing this subject, students will gain a basic understanding and overview of methods in biological modeling.	
Class syllabus: Biological modeling with ordinary differential equations: the principle of mass balance, mass action rule, scaling and nondimensionalisation, one-component models (Michaelis-Menten kinetics, gene autoregulation), multi-component models (biological switches, oscillators, epidemiology). Modeling with differential equations with delay. Models with spatial component: the reaction-diffusion systems, the spread of epidemics, pattern formation. Stochastic models: probability balance equation, Gillespie simulation algorithm, stochastic models of gene expression.	
Recommended literature: Mathematical biology : 1. : An introduction / J. D. Murray. New York : Springer, 2002 Mathematical biology : 2. : Spatial models and biomedical applications / J. D. Murray. New York : Springer, 2003 Keener, J., Sneyd, J., Mathematical physiology: I. Cellular physiology, 2nd. ed., Springer, New York, 2008 Wilkinson, D., Stochastic modelling for systems biology, 2nd ed., Chapman & Hall/CRC, Boca Raton, 2012.	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution
Total number of evaluated students: 71

A	B	C	D	E	FX
39,44	18,31	19,72	14,08	5,63	2,82

Lecturers: doc. Mgr. Pavol Bokes, PhD.

Last change: 19.10.2016

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-151/15	**Course title:** Multivariate Statistical Analyses
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 2 **per level/semester:** 26 / 26 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Preliminary assessment: test (60%) Final examination: oral examination (40%) Approximate final assessment: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 60/40	
Learning outcomes: After completing the course, students will master multivariate regression analysis, analysis of variance and covariance; further, they will be able to formulate and use multivariate statistical analyses in practical situations.	
Class syllabus: - Random vectors. (Random vectors, multivariate distributions, their densities, moments, and characteristic functions, transformations.) - Multivariate normal distribution. (Properties of the multivariate normal distribution, marginal and conditional distributions.) - Distribution of quadratic forms. (Wishart distribution, Hotelling distribution.) - Estimating the parameters of multivariate linear models. (Likelihood function, maximum likelihood estimation, Cramer-Rao inequality.) - Testing the hypotheses in multivariate linear models. (Likelihood ratio test, tests on parameters of the normal distribution, linear hypotheses.) - Multivariate linear regression. (Linear regression model, least squares method.) - Multivariate analysis of variance. (Analysis of variance model, one- and two-factor models, repeated measures model, profile analysis, growth curve models, multivariate analysis of variance.) - Analysis of covariance.	
Recommended literature: Applied multivariate statistical analysis / Wolfgang Karl Härdle, Léopold Simar. Heidelberg : Springer, 2012 Multivariate statistics: : Exercises and solutions / Wolfgang Härdle, Zdeněk Hlávka. New York : Springer, 2007	

Languages necessary to complete the course:
Slovak, English

Notes:
Additional information: http://www.iam.fmph.uniba.sk/ospm/Filova/teaching.htm

Past grade distribution
Total number of evaluated students: 198

A	B	C	D	E	FX
44,44	16,67	18,18	10,61	8,08	2,02

Lecturers: doc. Mgr. Lenka Filová, PhD.

Last change: 24.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-212/15	**Course title:** Nonparametric Statistics
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: written exam Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 0/100	
Learning outcomes: Students are able to apply basic nonparametric methods to real data. They also understand the principles and the mathematical background of these methods.	
Class syllabus: Sign test and a confidence interval for the true median. Wilcoxon signed rank test, Hodges-Lehmann estimator of location and the corresponding confidence interval. Sign test and Wilcoxon test for paired data. Wilcoxon rank sum test and Mann-Whitney test. Hodges-Lehmann estimator of shift and the corresponding confidence interval. Problem of ties. Kruskal-Wallis test and some post-hoc tests. Spearmans's rho, Kendall's tau. Theil's tests, estimators and confidence intervals concerning parameters of simple linear regression. Estimator's robustness to outliers (breakdown point). Kolmogorov-Smirnov tests. Cramér-von Mises test. Multimariate tests: component-wise sign test, Rayleigh test, Randles test by means of interdirections. Availability of the discussed methods in the software R.	
Recommended literature: Rublík F: Neparametrické metódy. Veda 2011; Lehmann E: Nonparametrics: Statistical Methods Based on Ranks (revised edition). Springer 2006; Hollander M, Wolfe D A, Chicken E: Nonparametric statistical methods 3rd ed. Wiley 2013;	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution
Total number of evaluated students: 158

A	B	C	D	E	FX
68,99	12,03	6,96	5,06	4,43	2,53

Lecturers: Mgr. Ján Somorčík, PhD.

Last change: 11.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KMANM/2-EFM-101/15	**Course title:** Numerical Modelling

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Preliminary assessment: 2 written tests 10 points each, project 20 points
Final examination: written exam for 50 points and oral exam for 10 points
Grading scheme: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 40/60

Learning outcomes:
Student will be able to solve ordinary and partial differential equations by modern numerical methods.

Class syllabus:
Numerical methods for ordinary differential equations.
Initial value problem, one-step and multistep methods of Runge-Kutta type.
Methods for Solving Ordinary Differential Equations.
Applications of ODR numerical methods in physics and biology.
Numerical solution of boundary value problems for ordinary differential equations, difference method, shooting method.
Partial differential equation: Finite difference method for parabolic, hyperbolic and elliptic problems in 2D, explicit and implicit methods, stability, alternating direction method.
Applications of PDR numerical methods in physics and biology.
Implementation of numerical algorithms in Matlab and Python.

Recommended literature:
Numerická matematika II : Numerické řešení diferenciálních rovnic / Emil Vitásek. Praha : Univerzita Karlova, 1981
Numerické metody / Emil Vitásek. Praha : Státní nakladatelství technické literatury, 1987
Numerické metódy / Jela Babušíková, Marián Slodička, Juraj Weisz. Bratislava : Univerzita Komenského, 2000

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 207

A	B	C	D	E	FX
25,12	16,43	18,84	22,71	14,01	2,9

Lecturers: Mgr. Jela Babušíková, PhD., RNDr. Patrik Mihala, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-118/15	**Course title:** Optimal Control (1)

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 2 **per level/semester:** 26 / 26
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
A total of 100 points can be obtained from the subject Optimal Control I. It is possible to have a maximum of 40 points from the exercises. Points can be obtained by project 40p, by solving problems at the board - 0 to 2 points per exercise. A necessary condition for the evaluation of E and better is at least 15 points from the exercises. It is possible to obtain 60 points from the written exam.
If the necessary conditions (15C) are met, the classification is as follows:
Classification: A 90 and more points B 80-89 points C 70-79 points D 60-69 points E 50-59 points
The obtained evaluation can be improved or worsened by one degree by a voluntary oral exam, or improved or worsened by an oral exam at the initiative of the teacher.
Weight of midterm / final assessment: Mid-term assessment 40% / 60% final exam.
Scale of assessment (preliminary/final): 30/70

Learning outcomes:
The course provides an overview of the optimal control theory for solving optimization problems and reviews its main applications. The course introduces the basic methods of solving discrete problems that lead to the problems of dynamic programming. Moreover, methods allowing quantitative analysis for discrete problems are discussed.

Class syllabus:
Brief outline:
Formulation of deterministic discrete problems of optimal control. Equation of dynamic programming for problems with finite and infinite time horizon. Methods of its solutions. Stochastic problems. Control and feedback control. Solving problems. Necessary conditions of optimality of variation type for discrete problems. Principle of maximum, economic interpretation of the adjoint variable, discrete Euler equation. Quality analysis.

Recommended literature:
Literature:
M. Halická, P. Brunovský, P. Jurča: Optimálne riadenie. Viacetapové rozhodovacie procesy v ekonómii a financiách, EPOS, Bratislava 2009 (English translation)

Languages necessary to complete the course:

Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 213

A	B	C	D	E	FX
26,29	21,13	23,47	13,62	11,27	4,23

Lecturers: doc. RNDr. Margaréta Halická, CSc., RNDr. Zuzana Chladná, Dr.

Last change: 17.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-109/00	**Course title:** Optimal Control (2)

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: II.

Prerequisites: FMFI.KAMŠ/2-EFM-118/15 - Optimal Control (1)

Course requirements:
Interim evaluation: The course does not have an interim evaluation.
Examination: written exam (the obtained evaluation can be adjusted by one degree by oral examination)
Indicative assessment scale: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 0/100

Learning outcomes:

Class syllabus:
Problems for calculus of variations and Euler's equation. Formulating the continuous optimal control problems. Pontryagin's maximum principle for different types of problems. Methods of analytic and numeric solutions (boundary-value problem), analysis of phase portraits. Solving problems. Problem of optimal consumption and Ramsey's model. Equation of dynamic programming, economic interpretation of the adjoint variable. Existence of optimal control. Sufficient conditions of optimality. Singular control. Problems with infinite time horizon.

Recommended literature:
M. Halická, P. Jurča: Optimálne riadenie 2 (učebný text http://pc2.iam.fmph.uniba.sk/institute/halicka/)
M.I. Kamien, N.L. Schwartz: Dynamic Optimization. The Calculus of Variations and Optimal Control in Economics and Management, ELSEVIER 1995

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 559

A	B	C	D	E	FX
26,3	16,99	14,67	14,67	25,22	2,15

Lecturers: doc. RNDr. Margaréta Halická, CSc.

Last change: 17.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-147/15	**Course title:** Optimal Control Classes
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 178	

A	B	C	D	E	FX
52,81	23,6	11,8	7,87	1,69	2,25

Lecturers: Mgr. Jana Szolgayová, PhD.	
Last change: 02.06.2015	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-107/15	**Course title:** Partial Differential Equations
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 2 **per level/semester:** 26 / 26 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Assessment during the term: two tests (2x20%). Exam: written and oral exam (60%). Grading: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 40/60	
Learning outcomes: The student will master the basics of classical methods of solving partial differential equations with an emphasis on applications used in financial mathematics. The output of the class is obtaining key knowledge and competences in the field of partial differential equations.	
Class syllabus: Partial differential equations and mathematical modeling. Derivation of partial differential equations of continuity, heat equation and equation of vibrating string. Derivation of the Black-Scholes model for valuation of derivatives. First order linear PDEs. The first integral and method of characteristics. Second order linear PDEs. Parabolic equations. Green function method on an unbounded interval. Explicit solution of European call and put options. Fourier method of separation of variables for problems on a bounded interval. Comparison principle and smoothing of solutions of parabolic equations. Hyperbolic equations. D'Almbert's formula for the oscillations of an unbounded string. Elliptic equations and harmonic functions. Green's representation of the solution to the Poisson equation. The maximum principle and its use in the proof of the fundamental theorem of algebra.	
Recommended literature: Parciálne diferenciálne rovnice a ich aplikácie / Daniel Ševčovič. Bratislava : Iris, 2008 Linear partial differential equations for scientists and engineers / Tyn Myint-U, Lokenath Debnath. Boston : Birkhäuser, 2007 Sbornik zadač po differencial'nym uravnenijam / Aleksej Fedorovič Filippov. Moskva : Nauka, 1979	
Languages necessary to complete the course: Slovak, English	

Notes:

Past grade distribution
Total number of evaluated students: 209

A	B	C	D	E	FX
43,54	29,19	16,75	7,66	2,39	0,48

Lecturers: prof. RNDr. Daniel Ševčovič, DrSc., doc. RNDr. Beáta Stehlíková, PhD.

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-135/00	**Course title:** Pensions and Pension Funds
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: During the semester the student can get 50% of the assessment for one presentation. The final oral exam has a weight of 50%. Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%. Scale of assessment (preliminary/final): Practical work during semester 50% / final exam 50%.	
Learning outcomes: After completing the course, the student will know the basic principles and functions of pension schemes. He or she will get acquainted with the pension system of the Slovak Republic and old-age pension schemes of some other countries of the world. The student will be able to valuate assets and liabilities of various types of pension systems, such as defined benefit (DB) schemes and defined contribution (DC) schemes.	
Class syllabus: Three pillars of pension system: compulsory, supplementary, personal. Pension system in Slovakia. The pay-as-you-go system, funded pension scheme. Defined benefit (DB) plans and defined contribution (DC) plans. Benefits not depending on previous earnings, depending on average salary or last salaries. One-time lump sum death benefit. Transfers. Funding plans. Pension funds investment.	
Recommended literature: Penze: kvantitativní přístup / Tomáš Cipra, Praha : Ekopress, 2012; Pensions at a Glance 2019 / OECD and G20 Indicators, Paris : OECD Publishing, 2019; https://doi.org/10.1787/b6d3dcfc-en; An Introduction to Pension Schemes / E. M. Lee, London : Institute and Faculty of Actuaries, 1986; study materials of lecturers.	
Languages necessary to complete the course: Slovak, English	

Notes:

Past grade distribution
Total number of evaluated students: 38

A	B	C	D	E	FX
52,63	26,32	5,26	0,0	13,16	2,63

Lecturers: Mgr. Gábor Szűcs, PhD., doc. Mgr. Igor Melicherčík, PhD.

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KMANM/2-MMN-238/19	**Course title:** Performance Marketing

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 18

A	B	C	D	E	FX
33,33	38,89	16,67	5,56	0,0	5,56

Lecturers: Mgr. Ján Laurenčík

Last change: 06.02.2020

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KTV/2-MXX-110/00	**Course title:** Physical Education and Sport (1)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:

Class syllabus:
Practicing of the students´ game skills in collective sports: basketball, volleyball, football, floorball and hockey. Mastering of the basic technique of a particular sport discipline in other sports. In paddling, basic training on still and slightly flowing water. Development of coordination skills, improvement of articular mobility and cardiovascular system.

Recommended literature:

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 1657

A	B	C	D	E	FX
98,37	0,6	0,06	0,0	0,0	0,97

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KTV/2-MXX-120/00	**Course title:** Physical Education and Sport (2)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: Practicing of offensive and defensive game combinations and playing with modified rules in collective sports such as basketball, volleyball, football, floorball, hockey. Command of elements of higher difficulty in locomotion skills (swimming - crawl stroke, breast stroke, butterfly stroke, trampoline jumping and aerobics – practicing of areobics compositions, bodybuilding – development of the main muscle groups, paddling on running water. Testing of the level of physical fitness and coordination skills.	
Recommended literature:	
Languages necessary to complete the course: Slovak, English	
Notes:	
Past grade distribution Total number of evaluated students: 1557	

A	B	C	D	E	FX
98,52	0,39	0,06	0,06	0,06	0,9

Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Branislav Nedbálek, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký	
Last change: 15.03.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KTV/2-MXX-210/00	**Course title:** Physical Education and Sport (3)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: To improve offensive and defensive game combinations in collective sports. Practicing of tactical and technical elements in individual sports. Compensatory exercises to correct wrong body posture. Stretching. Competition rules in sport disciplines.	
Recommended literature:	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution
Total number of evaluated students: 1281

A	B	C	D	E	FX
98,75	0,47	0,08	0,0	0,0	0,7

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Júlia Raábová, PhD., Mgr. Branislav Nedbálek, Mgr. Tomáš Lovecký

Last change: 15.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KTV/2-MXX-220/00	**Course title:** Physical Education and Sport (4)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes:	
Class syllabus: Sport training for Faculty Championships in a selected sport with modified rules. Selection of sport-talented students into teams of the Faculty Sport League, University League of Bratislava Faculties, and participation in sport events of the Faculty and University.	
Recommended literature:	
Languages necessary to complete the course: Slovak, English	
Notes:	
Past grade distribution Total number of evaluated students: 1110	

A	B	C	D	E	FX
98,47	0,45	0,09	0,09	0,09	0,81

Lecturers: PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, Mgr. Jana Leginusová, Mgr. Tomáš Kuchár, PhD., PaedDr. Mikuláš Ortutay, Mgr. Martin Dovičák, PhD., Mgr. Branislav Nedbálek, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký	
Last change: 15.03.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-238/17	**Course title:** Political Economics

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 84

A	B	C	D	E	FX
98,81	0,0	0,0	0,0	0,0	1,19

Lecturers: doc. RNDr. Ján Boďa, CSc.

Last change:

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-221/21	**Course title:** Practical Data Modeling

Educational activities:
Type of activities: course
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: II.

Prerequisites:

Recommended prerequisites:
Basics of set theory: set, subset, element, Cartesian product, relation.

Antirequisites: FMFI.KAMŠ/2-EFM-221/20

Course requirements:
Participation in lectures and individual project
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Data model is the base for any IT system. Many system functions reuse the same data so their structure and description is crucial for consistent service to users. Without a data model you cannot create a nontrivial and functioning database. SQL alone does not help you - the data model represents what you want to implement, and SQL is only the tool, which helps you just to transform the data model to a working database. Students gain the ability to work with data models, understand them and to design data models for relational databases efficiently.

Class syllabus:
Relation between data and functions in an IT system. Explanation of core terms also using examples: entities, attributes, relationships, identifiers, data domains, information types, constraints, conceptual, logical and physical levels of data models, conceptual and logical data model patterns, hierarchies, data historization. The course contains one lecture about the basics of relational databases and SQL as a motivation of some of the changes in logical data model.

Recommended literature:
Lectures and materials from them.

Languages necessary to complete the course:
English

Notes:
1. Relation to courses about SQL and relational databases:
- Courses on SQL and relational databases contain usually only little about data modeling - graduates usually do not succeed to create data model for nontrivial requirements.

- Courses on data modeling contain usually only little about relational databases and SQL - graduates usually do not succeed to transform logical data model to a functioning database for nontrivial requirements.
That is why it is important for efficient use in practice to attend both courses - for one course of standard size it is usually too much contents.
2. During the semester student works on individual project. Final grade depends primarily on the presentation and defense of result of the individual project.

Past grade distribution
Total number of evaluated students: 1

A	B	C	D	E	FX
0,0	0,0	100,0	0,0	0,0	0,0

Lecturers: RNDr. Pavol Meravý, CSc.

Last change: 14.08.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-152/15	**Course title:** Principles of Mathematical Modelling in Science and Engineering
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Interim assessment during the semester has a weight of 40% (homeworks 30%, bonus exercises 10%). The two semester exam papers have a total weight of 60% (the first paper taken in the middle of the semester, the second paper taken at the end of the semester). The student must obtain at least half of the points from each semester exam paper. The final evaluation can be adjusted by an oral exam (theoretical questions, written preparation). Grading: A (100-91), B (90-81), C (80-71), D (70-61), E (60-51), FX (50-0) Scale of assessment (preliminary/final): Weight of the intermediate / final evaluation: 40/60	
Learning outcomes: By completing this course, the student will gain knowledge of the principles of mathematical modeling of phenomena in the natural and technical sciences.	
Class syllabus: Basic principles of modeling. Principle of nondimensionalisation. Buckingham Pi-theorem. Dimensionless parameters. Asymptotic expansion, convergence vs. divergence, uniformity. Matched asymptotic approximations. Application of asymptotic methods: Van der Pol oscillator. Heat transfer model. Degenerate diffusion. Material derivative. Vorticity. Viscous flow. Flow instability and transition to turbulence.	
Recommended literature: A. C. Fowler, Mathematical Models in the Applied Sciences, Cambridge University Press, 1997 A. Quarteroni, P. Gervasio, A Primer on Mathematical Modelling, Springer, 2020	
Languages necessary to complete the course: Slovak, English	
Notes:	

Past grade distribution
Total number of evaluated students: 74

A	B	C	D	E	FX
54,05	20,27	9,46	5,41	2,7	8,11

Lecturers: doc. RNDr. Peter Guba, PhD.

Last change: 22.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-215/17	**Course title:** Quantitative Methods in Risk Management

Educational activities:
Type of activities: practicals / seminar
Number of hours:
per week: 1 / 2 **per level/semester:** 13 / 26
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:

Learning outcomes:

Class syllabus:

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 82

A	B	C	D	E	FX
35,37	20,73	23,17	10,98	3,66	6,1

Lecturers: Mgr. Ing. Pavol Jurča, PhD.

Last change:

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-161/00	**Course title:** Russian Language (1)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.	
Class syllabus: To master the fundamentals of general Russian. The language level is A1. Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts. The subject provides a course in Russian language for beginners.	
Recommended literature: The textbook: : Точка Ру А1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 707	

A	B	C	D	E	FX
58,56	16,55	11,03	4,38	1,84	7,64

Lecturers: Viktoria Mirsalova	
Last change: 20.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-162/00	**Course title:** Russian Language (2)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 2.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.

Class syllabus:
To master the fundamentals of general Russian.
Learning the Cyrillic (Russian) alphabet, gaining basic language competence, building up skills and confidence in dealing with unfamiliar authentic and semi-authentic texts.
The subject continues the program of Russian language (1) and provides a course of Russian for beginners.

Recommended literature:
Textbook: Точка Ру A1 (Ольга Долматова, Екатерина Новачац), pracovné karty Падежи 1 (Л.С. Безкоровайная, В.Е. Штыленко).

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 421

A	B	C	D	E	FX
65,08	15,68	8,79	3,8	0,95	5,7

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-261/00	**Course title:** Russian Language (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Basic communication in Russian, developing other Russian language skills - listening comprehension, reading and writing.

Class syllabus:
Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.
The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.

Recommended literature:
Точка Ру А2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 200

A	B	C	D	E	FX
70,5	17,5	8,5	2,5	0,0	1,0

Lecturers: Viktoria Mirsalova

Last change: 20.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-262/00	**Course title:** Russian Language (4)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 4.	
Educational level: I., II.	
Prerequisites:	
Course requirements: Scale of assessment (preliminary/final): 100/0	
Learning outcomes: Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary.	
Class syllabus: Learning the handwritten Russian (Russian Cursive Cyrillic), developing further language skills, gaining knowledge of Russian culture, history and way of life, pre-intermediate to intermediate grammar and vocabulary. The course "Russian for Intermediate Students" is a follow-up to "Russian for Beginners". The subject of the course is general Russian in the range appropriate to the given level.	
Recommended literature: Точка Ру A2 (Ольга Долматова, Екатерина Новачац) a Short Stories in Russian (Olly Richards, Alex Rowlings)	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 144	

A	B	C	D	E	FX
75,69	13,19	6,94	2,78	0,69	0,69

Lecturers: Viktoria Mirsalova	
Last change: 20.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-140/19	**Course title:** SQL Databases
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 2 **per level/semester:** 26 / 26 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KAMŠ/2-EFM-140/15	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 166

A	B	C	D	E	FX
33,73	12,05	18,67	16,87	12,65	6,02

Lecturers: Mgr. Róbert Breier, PhD., RNDr. Tibor Ženiš, PhD.	
Last change:	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-140/19	**Course title:** SQL Databases
Educational activities: **Type of activities:** lecture / practicals **Number of hours:** **per week:** 2 / 2 **per level/semester:** 26 / 26 **Form of the course:** on-site learning	
Number of credits: 5	
Recommended semester: 3.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KAMŠ/2-EFM-140/15	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 166

A	B	C	D	E	FX
33,73	12,05	18,67	16,87	12,65	6,02

Lecturers: Ing. Alexander Šimko, PhD.	
Last change:	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-143/17	**Course title:** Selected Actuarial Techniques
Educational activities: **Type of activities:** seminar **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1., 3.	
Educational level: II.	
Prerequisites:	
Course requirements: During the semester the student can get 100% of points, for solving individual assignments (50%) and elaboration and submission of the semester project (50%). Grade thresholds: A: 100.00% – 90.00%; B: 89.99% – 80.00%; C: 79.99% – 70.00%; D: 69.99% – 60.00%; E: 59.99% – 50.00%; Fx: 49.99% – 0.00%. Scale of assessment (preliminary/final): Practical work during semester 100% / final exam 0%.	
Learning outcomes: After completing the course the student will master basic methods of work in life and non-life insurance in an international insurance company focusing on methods of cash-flow projection. He or she will be able to calculate actuarial and financial indicators.	
Class syllabus: Actuarial models in life insurance. Modelling the development of insurance contracts from the perspective of the client. Development of the number of insurance contracts with respect to the expected probability of death and lapse. Development of the mathematical reserves in the entire portfolio. Modelling of other variables affecting the profit of the insurance company. Modelling the future profits using the direct method. Modelling the future profits using the indirect method. Modelling of the present value of financial indicators. Impact of changes in assumptions on the profit of an insurance company. Data preparation for modelling using the software R. Application of Generalized Linear Models (GLM) using the software R – selecting of appropriate parameters, presentation of results using R Shiny package. Portfolio management in the insurance company using actuarial and financial indicators and relationships between them.	
Recommended literature: Modern Actuarial Risk Theory Using R / Rob Kaas, Marc Goovaerts, Jan Dhaene, Michel Denuit. Heidelberg : Springer, 2008, ISBN: 978-3-540-70998-5; Jazyk R v aktuárskych analýzach / Michal Páleš. Bratislava : Vydavateľstvo EKONÓM, 2017, ISBN 978-80-225-4331-6;	

Jazyk R pre aktuárov / Michal Páleš. Bratislava : Vydavateľstvo EKONÓM, 2019, ISBN 978-80-225-4331-6;
Zurich Insurance Company Ltd internal training materials.

Languages necessary to complete the course:
Slovak, English

Notes:
Limit: maximum 25 students.
It is recommended to have basic R-software skills. At the seminars, we present quantitative techniques used by actuaries and use real data sets from the area of life and non-life insurance.

Past grade distribution
Total number of evaluated students: 69

A	B	C	D	E	FX
53,62	18,84	11,59	10,14	4,35	1,45

Lecturers: Mgr. Marek Šipicki

Last change: 15.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-171/20	**Course title:** Slovak Language for Foreign Students (1)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 1.	
Educational level: I., II.	
Prerequisites:	
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0	
Learning outcomes: This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.	
Class syllabus: The sylabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1).	
Recommended literature: Krížom- Krážom Slovenčina 1, additional material to further support the covered topics.	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 23	

A	B	C	D	E	FX
47,83	0,0	0,0	0,0	0,0	52,17

Lecturers: Mgr. Aneta Barnes	
Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KJP/1-MXX-172/20	**Course title:** Slovak Language for Foreign Students (2)
Educational activities: **Type of activities:** practicals **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: I., II.	
Prerequisites:	
Course requirements: tests Course prerequisites: https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/ Scale of assessment (preliminary/final): 100/0	
Learning outcomes: This course is aimed for foreign students to learn the fundamentals of the Slovak language with the focus on basic communication as well as all other language skills- listening comprehension,reading and writing.	
Class syllabus: The sylabus is targeted at the comprehension of the basics of the Slovak language for the absolute beginners (A1) and this course is a follow up course to the Slovak language course 1.	
Recommended literature: Krížom- Krážom Slovenčina 1, additional material to further support the covered topics	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 22	

A	B	C	D	E	FX
81,82	0,0	4,55	0,0	0,0	13,64

Lecturers: Mgr. Aneta Barnes	
Last change: 21.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-271/20	**Course title:** Slovak Language for Foreign Students (3)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.

Class syllabus:
The sylabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 2.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 8

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KJP/1-MXX-272/20	**Course title:** Slovak Language for Foreign Students (4)

Educational activities:
Type of activities: practicals
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 4.

Educational level: I., II.

Prerequisites:

Course requirements:
tests
Course prerequisites:
https://fmph.uniba.sk/microsites/kjp/katedra-jazykovej-pripravy/poziadavky-na-udelenie-priebezneho-hodnotenia-aj1aj2aj3-ostatne-kurzy/
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
This course is aimed for foreign students to better comprehend all the language skills important to enable correct usage of the Slovak language – listening comprehension, reading, writing and speaking.

Class syllabus:
The sylabus is targeted at the comprehension of all the language skills of the Slovak language , and it is a follow up course to the Slovak language course 3.

Recommended literature:
Krížom-Krážom Slovenčina 2, additional material to further support the covered topics.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 7

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Aneta Barnes

Last change: 21.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-155/21	**Course title:** Social Network Analysis

Educational activities:
Type of activities: seminar
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: II.

Prerequisites:

Recommended prerequisites:
Basics of R language

Antirequisites: FMFI.KAMŠ/2-EFM-155/18

Course requirements:
Assessment during the term: homework, project
Assessment: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 100/0

Learning outcomes:
Students gain an overview of different methods used in analysis of social networks. They will be able to apply them to real data using R software.

Class syllabus:
Basic notions of graph theory, examples of graphs/networks, their visualization. Node centralities - classical centralities (degree, closeness, betweenness, eigenvector centrality), selected new centrality measures, applications. Detection of communities in networks - concept of modularity, modularity optimization, selected other methods, applications. Networks based on correlations between time series. Random networks and their basic properties.

Recommended literature:

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 17

A	B	C	D	E	FX
58,82	0,0	29,41	11,76	0,0	0,0

Lecturers: doc. RNDr. Beáta Stehlíková, PhD.

Last change: 30.09.2021
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-123/15	**Course title:** Special Topics in Econometrics
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	

Past grade distribution
Total number of evaluated students: 0

A	B	C	D	E	FX
0,0	0,0	0,0	0,0	0,0	0,0

Lecturers: doc. Mgr. Marián Grendár, CSc.

Last change: 02.06.2015

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KTV/2-MXX-115/17	**Course title:** Sports in Natur (1)

Educational activities:
Type of activities:
Number of hours:
per week: per level/semester:
Form of the course: on-site learning

Number of credits: 2

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Grades: A 90%, B 80%, C 70%, D 60%, E 50%
The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines.

Learning outcomes:
Acquisition and development of basic motor skills and abilities in selected sports: skiing and snowboarding. Mastering the correct technique of performing individual movements, which are necessary for skiing and snowboarding.

Class syllabus:
The student can sign up for the outdoor sports courses offered by the department: skiing, snowboarding. The lessons in the courses are focused on the development of basic and special movement skills and mastering the techniques needed for the sports.

Recommended literature:

Languages necessary to complete the course:
Slovak

Notes:
KTVŠ does not rent ski equipment.

Past grade distribution
Total number of evaluated students: 83

A	B	C	D	E	FX
100,0	0,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD.

Last change: 16.06.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KTV/2-MXX-116/18	**Course title:** Sports in Natur (2)
Educational activities: **Type of activities:** **Number of hours:** **per week: per level/semester:** **Form of the course:** on-site learning	
Number of credits: 2	
Recommended semester: 2.	
Educational level: II.	
Prerequisites:	
Course requirements: Grades: A 90%, B 80%, C 70%, D 60%, E 50%. The condition for the award of 1 or 2 credits is the completion of a multi-day course in its full scope, or the completion of one-day courses in the scope of 4 days. Candidates can apply to the leaders of individual courses. From the presented offer of courses, you can choose the one that suits your interests, abilities and deadlines.	
Learning outcomes: Creating a positive and lasting relationship with physical activity. Acquisition and mastery of basic motor skills and abilities in outdoor sports: windsurfing, beach volleyball, water tourism - river rafting, hiking and other sports according to interest. Training and improving the technique needed for the sports.	
Class syllabus: The student can sign up for the outdoor sports courses offered by the department: water tourism - river rafting, windsurfing, beach volleyball, hiking and other hobby sports. The lessons in the courses are focused on the development of basic and special movement skills and, mastering the techniques needed for the sports.	
Recommended literature:	
Languages necessary to complete the course: Slovak	
Notes: KTVŠ will provide sports equipment.	
Past grade distribution Total number of evaluated students: 50	

A	B	C	D	E	FX
94,0	0,0	0,0	0,0	0,0	6,0

Lecturers: Mgr. Martin Dovičák, PhD., Mgr. Tomáš Kuchár, PhD., Mgr. Jana Leginusová, PaedDr. Dana Mašlejová, Mgr. Ladislav Mókus, PaedDr. Mikuláš Ortutay, Mgr. Júlia Raábová, PhD., Mgr. Tomáš Lovecký

Last change: 16.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-104/17	**Course title:** Stochastic Calculus and Its Applications

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 3 / 1 **per level/semester:** 39 / 13
Form of the course: on-site learning

Number of credits: 5

Recommended semester: 1.

Educational level: II.

Prerequisites:

Course requirements:
Written test during the semester;
Written exam
Scale of assessment (preliminary/final): 0/100

Learning outcomes:
Mastering the priciples of the Lebesgue integral theory, stochastic calculus and valuation of derivatives based on the Wiener process. The aim of the course is also to acquire key knowledge of classical methods of valuation of financial derivatives.

Class syllabus:
1. Theory of Lebesgue integral
2. Wiener process, Ito's integral, Ito's lemma
3. Black-Scholes model of pricing asset and currency derivatives
4. Models of interest rate development and pricing interest rate derivatives

Recommended literature:
Financial Calculus : An Introduction to derivate Pricing / Martin Baxter, Andrew Rennie. Cambridge : Cambridge University Press, 1996
Mathematical techniques in finance : Tools for incomplete markets / Aleš Černý. Princeton : Princeton University Press, 2009

Languages necessary to complete the course:
English

Notes:

Past grade distribution
Total number of evaluated students: 127

A	B	C	D	E	FX
30,71	29,13	25,2	9,45	5,51	0,0

Lecturers: doc. Mgr. Igor Melicherčík, PhD.

Last change: 02.09.2020
Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-103/00	**Course title:** Stochastic Methods of Operational Analysis

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 2.

Educational level: II.

Prerequisites:

Course requirements:
Scale of assessment (preliminary/final): 0/100

Learning outcomes:

Class syllabus:
Random chains, continuous and discrete Markov chains, Poisson process, Queueing theory (M/M/1, M/M/n, M/M/n/m, M/D/1), Inventory theory (basic deterministic and stochastic models). Newsvendor problem.

Recommended literature:
K. Janková, S. Kilianová, P. Brunovský, P. Bokes: Markovove reťazce a ich aplikácie. Epos, 2015
D. Gross, J. F. Shortle, J. M. Thompson C. M. Harris: Fundamentals of Queueing Theory, Fourth Edition. Wiley, 2008.

Languages necessary to complete the course:

Notes:

Past grade distribution
Total number of evaluated students: 497

A	B	C	D	E	FX
39,44	17,71	13,68	16,9	10,87	1,41

Lecturers: doc. Mgr. Soňa Kilianová, PhD.

Last change: 24.10.2016

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-PMS-129/10	**Course title:** Stochastic Optimization Methods

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: I., II.

Prerequisites:

Course requirements:
Evaluation: project, oral exam
Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50%
Scale of assessment (preliminary/final): 80/20

Learning outcomes:
Upon satisfactory completion of the course, students will be able to use selected optimization methods. The emphasize is put on heuristic methods of global optimization utilizing random elements (genetic algorithms, simulated annealing, particle swarm optimization, and so on).

Class syllabus:
Applications of linear programming in statistics. Algorithm Nelder-Mead. Simulated annealing. Genetic algorithms. Particle swarm optimization. Basics of constrained global optimization.

Recommended literature:
Algorithmics for hard problems : Introduction to combinatorial optimization, randomization, approximation, and heuristics / Juraj Hromkovič. Berlin : Springer, 2003
Spall JC: Introduction to stochastic search and optimization. Wiley, 2003
Online materials of the lecturer

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 173

A	B	C	D	E	FX
64,74	18,5	7,51	4,62	1,73	2,89

Lecturers: doc. Mgr. Radoslav Harman, PhD.

Last change: 10.03.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-PMS-123/10	**Course title:** Stochastic Simulation Methods
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 1.	
Educational level: II.	
Prerequisites:	
Course requirements: Evaluation based on: project (teaching period), oral exam Approximate grade thresholds: A 90%, B 80%, C 70%, D 60%, E 50% Scale of assessment (preliminary/final): 50/50	
Learning outcomes: The students understand the basic methods of computer sampling of random variables and vectors, apply them to the computation of Monte Carlo estimates and use them for the simulation of complex stochastic systems.	
Class syllabus: Generating random numbers, testing of random number generators, Sampling discrete random variables and vectors, Sampling continuous random variables and vectors, Statistical analysis of simulated data, Classical Monte Carlo methods.	
Recommended literature: Ross S: Simulation, Elsevier Academic Press 2006; Study materials of the lecturer.	
Languages necessary to complete the course: Slovak, English	
Notes: Enrollment limit: 40 students	
Past grade distribution Total number of evaluated students: 392	

A	B	C	D	E	FX
44,13	22,96	14,29	8,67	6,12	3,83

Lecturers: doc. Mgr. Radoslav Harman, PhD.	
Last change: 10.03.2022	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022	
University: Comenius University Bratislava	
Faculty: Faculty of Mathematics, Physics and Informatics	
Course ID: FMFI.KAMŠ/2-EFM-239/21	**Course title:** Theory of Evolutional Games
Educational activities: **Type of activities:** lecture **Number of hours:** **per week:** 2 **per level/semester:** 26 **Form of the course:** on-site learning	
Number of credits: 3	
Recommended semester: 4.	
Educational level: II.	
Prerequisites:	
Antirequisites: FMFI.KAMŠ/2-EFM-239/18	
Course requirements:	
Learning outcomes:	
Class syllabus:	
Recommended literature:	
Languages necessary to complete the course:	
Notes:	
Past grade distribution Total number of evaluated students: 2	

A	B	C	D	E	FX
50,0	50,0	0,0	0,0	0,0	0,0

Lecturers: Mgr. Juraj Hledík, PhD.	
Last change:	
Approved by:	

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-105/00	**Course title:** Theory of Non-Cooperative Games

Educational activities:
Type of activities: lecture
Number of hours:
per week: 2 **per level/semester:** 26
Form of the course: on-site learning

Number of credits: 3

Recommended semester: 3.

Educational level: II.

Prerequisites:

Course requirements:
Continuous Assessment: Separate Work, Homework (40 %), Midterm Test (30 %)
Test: Written exam
Indicative assessment scale: A 100-90%, B 89-80%, C 79-70%, D 69-60%, E 59-50%
Scale of assessment (preliminary/final): 70/30

Learning outcomes:
Students will be able to built models of strategic decision making in the presence of uncertainty. They will be able to decide in such situations as well as to determine optimal approaches.

Class syllabus:
Bayes games, Bayes-Nash equilibrium. Dynamic games with incomplete information. Four Bayes assumptions. Sequential equilibrium. Weak perfect Bayes equilibrium. Perfect Bayes equilibrium.

Recommended literature:
Microeconomic Theory / Andreu Mas-Colell, Michael D. Whinston, Jerry R. Green. New York : Oxford University Press, 4.Ed., 2022
Game theory / Drew Fudenberg, Jean Tirole. Cambridge, Mass. : MIT Press, 1998

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 470

A	B	C	D	E	FX
54,04	16,17	15,74	7,66	5,96	0,43

Lecturers: doc. RNDr. Ján Pekár, PhD.

Last change: 15.06.2022

Approved by:

COURSE DESCRIPTION

Academic year: 2021/2022

University: Comenius University Bratislava

Faculty: Faculty of Mathematics, Physics and Informatics

Course ID: FMFI.KAMŠ/2-EFM-102/15	**Course title:** Time Series Analysis

Educational activities:
Type of activities: lecture / practicals
Number of hours:
per week: 2 / 1 **per level/semester:** 26 / 13
Form of the course: on-site learning

Number of credits: 4

Recommended semester: 1.

Educational level: II.

Prerequisites:

Recommended prerequisites:
Basics of statistics (linear regression, analysis of residuals, testing hypotheses) and use of R language

Antirequisites: FMFI.KAMŠ/2-PMS-102/22 and FMFI.KAMŠ/2-INF-191/22 and FMFI.KAMS/2-INF-192/22

Course requirements:
Assessment during the term: homework (50%).
Exam: Written exam (50%).
Grading: A: 90 and more, B: [80, 90), C: [70, 80), D: [60, 70), E: [50, 60), FX: less than 50
Scale of assessment (preliminary/final): 50/50

Learning outcomes:
Student wll be able to model univariate time series using Box-Jenkins methodology and will know its theoretical background.

Class syllabus:
Introduction. Time series and their moments. Stationarity and ergodicity. White noise. Wold representation. Correlations between values of the process, autocorrelation function. Testing white noise, Ljung-Box Q-statistic.
Autoregressive models (AR), moving average models (MA), ARMA models. Stationarity and invertibility conditions. Computation of expected value, variance and covariances. Autocorrelation and partial autocorrelation function and their use in identification of the model. Predictions.
Differencing time series, integrated processes. Testing unit root. ADF test.
Seasonality, SARIMA models.
Modelling volatility, ARCH and GARCH models, their generalizations.
Modelling trend - exponential smoothing, Holt-Winters method, Hodrick-Prescott filter.
Spectral analysis of time series.

Recommended literature:

Introduction to modern time series analysis / Gebhard Kirchgässner, Jürgen Wolters. Berlin : Springer, 2008
Introductory time series with R / Paul S. P. Cowpertwait, Andrew V. Metcalfe. Dordrecht : Springer, 2009
Forecasting With Univariate Box-Jenkins Models : Concepts and Cases / Alan Pankratz. New York : John Wiley, 1983
Applied econometric time series / Walter Enders. New York : John Wiley, 2004
Time series analysis and its applications : with R examples / Robert H. Shumway, David S. Stoffer. New York : Springer, 2011

Languages necessary to complete the course:
Slovak, English

Notes:

Past grade distribution
Total number of evaluated students: 195

A	B	C	D	E	FX
34,36	29,23	24,1	8,21	3,08	1,03

Lecturers: doc. RNDr. Beáta Stehlíková, PhD.

Last change: 17.06.2022

Approved by: